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Abstract

FUEL REPROCESSING PLANT AT TROMBAY

H.N.Sethna and N.Srinivasan
Atomic Energy Establishment Trombay

A Fuel Reprocessing Plant based on the Purex process for aluminium clad uranium metallic fuel elements is nearing completion at Trombay. The Plant has provision for conversion of plutonium nitrate to any desired end product including plutonium metal. The "hot" equipment is housed in "cells" of haematite concrete walls (density 3.4 g/c.c) with thickness varying from 900 to 1,500 mm. Chemical dejacketing of the 3,400 mm. long fuel section and dissolution of uranium will be carried out in a 4,500 mm. long horizontal dissolver. Pulsed columns are used for all steps of extraction and ion exchangers are used for the final purification and concentration of plutonium nitrate. All aqueous wastes generated in the process are subjected to multiple stages of evaporation till the liquid effluents released to the environments are to drinking water tolerances. The concentrated acidic and alkaline active wastes are stored in underground reinforced concrete tanks lined with stainless steel and mild steel respectively with a total capacity of about 7,000 cubic metres.

All process equipment and piping are of AISI type 347 stainless steel. Welding for all the tanks, pipes etc. handling radioactive solutions has been carried out using inert gas arc welding. 100% of the joints have been radiographed to ASTM standards.

Exhaust air from cells and other active areas and process off-gas air are subjected to multiple stages of absolute filtration and exhausted through a 135 metres high reinforced concrete stack. Uninterrupted operation of

exhaust systems is ensured by stand-by fans and filters and provision of emergency power in case of failure of normal power supply.

When the Plant is completed, approximately 200 tonnes of stainless steel in the form of plates and structurals, 50,000 metres of stainless steel pipes, 3,000 cubic metres of heavy concrete, 20,000 cubic metres of normal concrete and 3,000 tonnes of mild steel would have been used. The plant complex with all equipment has cost about Rs. 360 lakhs (7.5 million dollars). The design, construction, fabrication of all equipment and installation were carried out by engineers of the Trombay Establishment.

The paper will indicate some of the difficulties encountered in the construction of the Plant and measures taken to overcome them.